APPENDIX C

WELL DEVELOPMENT LOGS

Groundwater Well Development Log

Fort McClellan , Alabama

Project Number: 796887
Form Completed by: Lee FLIPPEN
Well Developed by (person/firm): Lee FLIPPEN / The Shaw Group

Parcel No.: HR89Q
Well No.: MW01
Date started: 7-1-02

Monitoring Well Information

Development Method: surge + purge
Development Equipment: whale pumps, Horiba U-10, Aqua-TAST II, Heron water indicator, PID
Casing Diameter: 2" - .163

Beginning Measurments
Depth to Water (ft): Dry
Total depth of Well (ft): 45.75' TOC

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date) (Purge Rate, Pump Position, Misc.)
7-1-02 16:40	Ø	Dry							Well Dry 7-1-02 Lee Flippen
7-10-02 14:30	Ø	Dry							Well Dry 7-10-02 Lee Flippen
7-12-02 16:00	Ø	Dry							well Dry 7-12-02 Lee Flippen
:									
:									
:									
:									

TD - DTW = WC x 2'/4' well = One PV x 5 = Min PV + H20 to install well = Minimum H20 to remove

Groundwater Well Development Log

Fort McClellan , Alabama

Project Number: 796887
Form Completed by: MARK SHOEMAKER
Well Developed by (person/firm): MARK SHOEMAKER

Parcel No.: 899
Well No.: HR-899-MW02
Date started: 7/1/02

Monitoring Well Information

Development Method: WHALE PUMP
Development Equipment: WHALE PUMP, HORIBA U-10, ORION TURBIDIMETER
Casing Diameter: 2"

Beginning Measurments
Depth to Water (ft): 12.42' BTOC
Total depth of Well (ft): 40.10' BTOC

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date) (Purge Rate, Pump Position, Misc.)
10:37	0	12.42	6.13	0.207	694	5.96	22.5	TAN TURBID	PUMP 1' OFF BOTTOM SLOW 0.1 GPM
11:00	1.15	17.45	6.63	0.142	339	4.75	25.1	TAN CLOUDY	FLOW ADJUSTED 0.05 GPM
11:15	1.90	19.10	6.56	0.124	328	5.35	26.5	TAN CLOUDY	FLOW RATE 0.05 GPM PUMP @ 39'
11:30	2.65	20.15	6.53	0.124	288	5.75	26.7	TAN CLOUDY	FLOW RATE 0.05 GPM PUMP @ 39'
11:45	3.40	21.25	6.51	0.118	220	5.91	26.4	TAN CLOUDY	FLOW RATE 0.05 GPM PUMP @ 39'
12:00	4.15	22.29	5.95	0.109	587	5.20	24.7	TAN CLOUDY	FLOW RATE 0.05 GPM PUMP @ 39'
12:15	4.90	23.05	5.84	0.107	260	4.90	25.5	TAN CLOUDY	FLOW RATE 0.05 GPM PUMP @ 39'

TD - DTW = WC x 2'/4' well = One PV x 5 = Min PV + H20 to install well = Minimum H20 to remove

40.10 - 12.42 = 27.68 * 0.163 = 4.51 X 5 = 22.56 + 100 = 122.56 gal

ac'd Kath

7/8/02

Parcel No.: 89Q
Well ID: HR-89Q-MW02
Date: 7/1/02

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date)
12:30	5.65	23.81	5.76	0.106	248	4.22	25.8	TAN CLOUDY	PUMP @ 39' FLOW @ 0.05 GPM
12:45	6.40	24.48	5.76	0.108	164	4.39	25.7	CLOUDY	PUMP @ 39' FLOW @ 0.05 GPM
13:00	7.15	25.08	5.84	0.101	140	4.97	24.9	CLOUDY	PUMP @ 39' FLOW @ 0.05 GPM
13:15	7.90	25.38	5.81	0.098	131	4.90	24.6	CLOUDY	PUMP @ 39' FLOW @ 0.05 GPM
13:30	8.65	25.39	5.82	0.096	92	4.50	24.5	CLEAR	PUMP @ 39' FLOW @ 0.05 GPM
13:45	9.40	25.39	5.83	0.094	89	4.95	24.7	CLEAR	PUMP @ 39' FLOW @ 0.05 GPM
14:00	10.90	25.50	6.26	0.090	134	4.94	21.6	CLOUDY	FLOW RATE ADJUSTED TO 0.1 GPM
14:15	12.40	25.44	5.69	0.077	98	3.75	20.8	CLOUDY	PUMP @ 39' FLOW @ 0.1 GPM
14:30	14.65	26.59	5.45	0.060	144	3.64	19.7	CLOUDY	FLOW RATE ADJUSTED TO 0.15 GPM
14:45	16.90	27.21	5.28	0.052	82	3.68	19.1	CLEAR	PUMP @ 39' FLOW @ 0.15 GPM
15:00	19.15	28.09	5.29	0.054	71	4.54	20.1	CLEAR	PUMP @ 39' FLOW @ 0.15 GPM
15:15	21.40	29.07	6.00	0.059	200	5.05	20.0	TAN CLOUDY	PUMP @ 39' FLOW @ 0.15 GPM

Parcel No.: 899
Well ID: HR-899-MW02
Date: 7/1-2/02
~~Lee FLIPPEN~~

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date)
15:30	23.65	30.22	5.96	0.059	238	6.12	19.6	CLOUDY	PUMP @ 39' FLOW @ 0.15 GPM
15:45	24.925	30.75	5.60	0.055	180	4.28	20.5	CLOUDY	FLOW RATE ADJUSTED TO 0.085 GPM
16:00	26.20	31.26	5.49	0.054	106	4.48	20.6	SLIGHTLY CLOUDY	PUMP @ 39' FLOW @ 0.085 GPM
16:15	27.475	31.74	5.53	0.054	76	5.31	20.8	CLEAR	PUMP @ 39' FLOW @ 0.085 GPM
16:30	28.75	32.09	5.61	0.061	64	6.29	20.9	CLEAR	PUMP @ 39' FLOW @ 0.085 GPM
CEASE DEVELOPMENT FOR DAY						7/1/02			
RESUME DEVELOPMENT				7/2/02					7/2/02
08:50	28.75	18.83	5.85	0.86	OFF SCALE	6.48	19.7	TAN THICK	PUMP @ 39' FLOW @ 0.085 GPM
09:00	30.025	20.48	5.33	0.064	373	5.67	20.4	TAN TURBID	PUMP @ 39' FLOW @ 0.085 GPM
09:15	31.30	22.88	5.43	0.055	1472	6.69	19.9	TAN TURBID	PUMP @ 39' FLOW @ 0.085 GPM
09:30	32.575	24.87	5.24	0.054	187	4.68	20.3	SLIGHTLY CLOUDY	PUMP @ 39' FLOW @ 0.085 GPM
09:45	33.85	26.41	5.24	0.054	199	4.84	20.9	SLIGHTLY CLOUDY	PUMP @ 39' FLOW @ 0.085 GPM
10:00	35.125	27.03	5.32	0.053	143	6.15	21.4	SLIGHTLY CLOUDY	PUMP @ 39' FLOW @ 0.085 GPM
10:15	36.40	27.40	5.47	0.052	141	4.90	21.4	SLIGHTLY CLOUDY	PUMP @ 39' FLOW @ 0.085 GPM

Parcel No.: 899
Well ID: NR-899-MW02
Date: 7/2/02

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date)
10:30	37.675	27.85	5.67	0.051	61	5.19	22.2	CLEAR	PUMP @ 39' FLOW @ 0.085 GPM
10:45	38.95	28.25	5.63	0.050	54	5.59	22.3	CLEAR	PUMP @ 39' FLOW @ 0.085 GPM
11:00	40.225	28.68	5.60	0.049	49	5.77	22.5	CLEAR	PUMP @ 39' FLOW @ 0.085 GPM
11:15	41.50	29.11	5.64	0.048	40	5.41	22.7	CLEAR	PUMP @ 39' FLOW @ 0.085 GPM
11:30	42.775	29.44	5.61	0.048	40	5.40	23.0	CLEAR	PUMP @ 39' FLOW @ 0.085 GPM
:	CEASE DEVELOPMENT — 8 HRS DEVELOPMENT TIME								
:									
:									
:									
:									
:									
:					7/2/02				

Groundwater Well Development Log

Fort McClellan , Alabama

Project Number:
Form Completed by: Jewel Cannigh
Well Developed by (person/firm): Jeff. A. - J-C & Shaw Etl

Parcel No.: 89 Q
Well No.: HR- 89Q - MW03
Date started: 06/27/02

Monitoring Well Information

PID - 0.0

Development Method: Surge Purge
Development Equipment: airlift pump ; DTW Meter ; PID Horiba
Casing Diameter: 2" PVC

Beginning Measurments
Depth to Water (ft): 20.80
Total depth of Well (ft): 58.30

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date) (Purge Rate, Pump Position, Misc.)
13.05	—	20.80	7.12	.0601	999+	3.97	21.9	Orange Cloudy	53.30 pump set .4 gl Surged
13:20	6 gal	33.25	5.48	.057	>1000	3.55	20.7	" "	" " " " "
13:35	12	38.25	5.59	.066	215	2.94	22.0	Cloudy	" " " " "
13:50	18	41.00	5.31	.065	53	2.95	21.9	Slightly Cloudy	" " " " "
14:05	24	41.70	5.61	.055	176	3.56	22.3	Cloudy	" " " " "
14:20	30	42.47	5.33	.057	240	3.24	21.2	"	" " " " "
14:35	36	43.28	5.30	.057	421	3.94	21.5	Orange Cloudy	" " " " "

TD - DTW = WC x 2"/4" well = One PV x 5 = Min PV + H20 to install well = Minimum H20 to remove

58.30 - 20.80 = 37.5 x .163 = 6.1125 x 5 = 30.6 + 115 = 145.6 gallons

acc'd 7/11/02

Parcel No.: 89Q
Well ID: HR-899-MW03
Date: 06/27/02
06/28/02

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date)
14:50	42	44.17	5.10	.054	871	3.65	20.8	Orange Very Cloudy	Pump set 53.30' .4g/m
15:05	48	45.92	4.77	.052	>1000	4.35	20.8	"	" " " " "
15:20	54	46.12	5.02	.051	>1000	4.12	20.7	Brown Muddy	Pump set 57.9' .25g/m
15:35	57.75	46.49	5.83	.049	"	4.74	22.3	Very Cloudy	" " " " "
15:50	61.25	49.17	5.55	.045	"	4.07	22.0	Brown Muddy	" " " .4g/m
16:05	67.25	51.26	5.58	.048	"	4.54	20.4	"	" " " " "
16:20	73.25	52.45	5.00	.043	"	4.26	20.3	"	" " " " "
16:35	79.25	53.06	4.86	.040	>1000	4.91	19.9	Brown Cloudy	" " " " "
:	End of Day	Shutdown							
13:15	79.25	23.01	6.31	.063	>1000	4.90	21.4	Very Cloudy Orange	Pump set 57.9' .45g/m
13:30	86	29.22	5.97	.051	801	4.97	20.4	" "	" " " " "
13:45	92.75	35.09	5.61	.039	269	5.07	19.8	Very Cloudy	" " " " "
14:00	99.5	39.98	4.98	.038	211	4.61	19.5	"	" " " " "
14:15	106.25	42.63	4.84	.037	70	5.21	20.0	Cloudy	" " " .70g/m

6/28/02 restart

Parcel No.: 89Q
Well ID: HR-899-MW03
Date: 06/28/02

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date)
14 :30	116.75	47.65	4.83	.036	>1000	7.01	19.2	Dark Orange	Pump set 57.9' .7gl
14 :45	125.25	52.09	4.76	.037	571	6.03	19.4	Very Cloudy	" " " " "
15 :00	135.75	54.19	4.64	.034	>1000	5.92	19.7	Cloudy Orange	" " " .2gl
15 :15	140.75	52.41	4.96	.041	58	5.67	20.4	Slightly Cloudy	" " " " "
15 :30	143.75	51.26	4.79	.035	41	5.31	21.0	Clourish	Pump Set 54' " "
15 :45	146.75	49.91	4.92	.032	~~5.4~~ 17.1	5.47	20.4	Clear	" " " " "
16 :00	149.75	48.42	5.07	.030	9.7	5.91	20.9	Clear	" " " " "
:									Taking Photo Sample
:									NTU - 9.7 Time 1600
:									Date 06/28/02
:									
:									
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11/17/00

Groundwater Well Development Log

Fort McClellan , Alabama

Project Number:
Form Completed by: Jeff Alex - Jewel Cleaning
Well Developed by (person/firm): J.A - JC - Shaw E&I

Parcel No.: 89Q
Well No.: HR-89Q-MW04
Date started: 06/26/02

Monitoring Well Information

Development Method: Surge - Purge
Development Equipment: Bladder pump, DTW Meter; PID Horiba;
Casing Diameter: 2" pvc

PID - 0.0 Well head ~~0.0~~ 1.2

Beginning Measurments
Depth to Water (ft): 33.56
Total depth of Well (ft): 60.10

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date) (Purge Rate, Pump Position, Misc.)
10 :20	—	33.56	8.49	.482	>1000	4.53	19.7	Very Cloudy	Pump set 59.10 Surge Q .33 gl
10 :35	5	40.46	8.13	.249	>1000	3.25	19.7	Cloudy	" " " " " "
10 :50	10	40.55	5.76	.108	74	3.97	20.3	Cloudy	" " " " "
11 :05	15	41.86	5.98	.194	625	3.91	21.3	Cloudy	" " " .29 gl
11 :20	18	44.20	6.53	.260	>1000	3.92	22.5	Very Cloudy	" " " .15 gl
11 :35	20.25	44.78	6.33	.278	>1000	3.20	20.4	" "	" " " .33 gl
11 :50	30.25	47.78	6.25	.334	485	2.32	21.3	Cloudy	" " " " "

1.95 l

TD - DTW = WC x 2' well = One PV x 5 = Min PV + H20 to install well = Minimum H20 to remove
60.10 - 33.56 = 26.54 x .163 = 4.33 x 5 = 21.63 + 110 = 131.63

acid [illegible] 7/2/02

Parcel No.: 89Q
Well ID: HK-89Q-MW04
Date: 06/26/02 - 06/27/02

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date) depth / bottom depth
12:05	30.25	46.69	5.97	.317	424	2.79	20.9	cloudy	.33 ~~.33~~ 1 ft
13:15	30.25	47.47	6.60	.431	436	2.98	20.2	"	.2 1 ft
13:30	33.25	50.43	6.77	.251	860	5.67	20.8	"	.2 1 ft
13:45	36.25	53.00	6.70	.402	521	3.67	21.2	"	.2 1 ft
14:00	39.25	top of pump well dry							62602
6/27 08:45	39.25	46.86	6.67	.391	157	4.04	18.4	"	.2 gl 59810 pump ST
09:00	42.25	49.56	7.19	.327	172	5.67	20.1	"	" " " " "
09:15	45.25	51.50	7.32	.322	118	5.84	21.2	Cloudy	" " " " "
09:30	48.25	53.07	7.32	.287	199	6.32	21.1	Cloudy	" " " " "
09:45	51.25	54.74	7.43	.346	276	5.83	21.3	Cloudy	" " " " "
10:00	54.25	56.70	7.93	.413	442	3.71	21.5	Cloudy	" " " " "
10:15	~~58.31~~	~~58.31~~						Very Cloudy	
		Pump Quit pumping too Close to pump well Dry							

Left margin: Tapped - Restart; 2.5; 3.5

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11/17/00

PID -0.0

Parcel No.: 89Q
Well ID: HR-89Q-MW01
Date: 06/28/02
07/01/02

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date)
10 :15	54.25	48.45	7.06	.314	95	5.20	19.5	Clear	Pump set 59.10' .25gpm
10 :30	58	50.39	7.12 ~~3.15~~	.315	116.1	5.09	19.7	Cloudy	" " " " "
10 :45	61.75	52.45	6.82	.259	229	6.09	19.9	Very Cloudy	" " " " "
11 :00	65.5	55.52	6.80	.294	199	6.26	20.7	" "	" " " " "
11 :12	Well	Went	Dry			3rd Time			
07/01/02									
12:15	Bailed	41.87	6.47	.188	20	7.44	21.27	Clear	Taking Grab Photo
:									Sample MW-20
:									12:15 - Time
:									
:									
:									
:									
:									

Groundwater Well Development Log

Fort McClellan, Alabama

Project Number: 796887
Form Completed by: Lee FLIPPEN
Well Developed by (person/firm): Lee FLIPPEN/

Parcel No.: HR89Q MW05
Well No.: MW05
Date started: 7-2-02

Monitoring Well Information

Development Method: Surge + purge
Development Equipment: Horiba U-22, Aquatest II, Heron water indicator, Grundfos Pump
Casing Diameter: 2"

Beginning Measurments
Depth to Water (ft): 28.84' TOC
Total depth of Well (ft): 81.14' TOC

screen 50'-80'

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date) (Purge Rate, Pump Position, Misc.)
09.35	Ø	28.84	11.18	1.05	999+	9.61	21.39	Brown	Depth 81', Purge Rate .75 gpm
09:50	11.25	38.61	Pump	stopped	working	—	—	Repairing	Grundfos pump
13:10	11.25	38.55	10.06	.292	999+	11.36	21.89	Brown	Restarted Parameters Depth 81', PR .7 gpm
13:25	21.75	60.61	8.51	.192	999+	10.51	21.98	Brown	Depth 81', PR .4 gpm
13:40	27.75	79.31	8.36	.155	999+	10.76	20.42	~~Brown~~	Depth 81', PR .25 gpm
13:55	31.5	75.55	6.55	.119	999+	7.61	27.48	Brown	Depth 81', PR .25 gpm
14:10	35.25	76.03	6.05	.146	999+	9.70	22.00	Brown	Depth 81', PR .2 gpm

TD - DTW = WC x 2'/4' well = One PV x 5 = Min PV + H20 to install well = Minimum H20 to remove
81.14 - 28.84 = 52.3 x .163 = 8.53 x 5 = 42.63 + 175g = 217.63g

cc'd Kathy S

7/8/02

Parcel No.: HR89Q
Well ID: MW05
Date: 7-3-02

Lee FLIPPEN

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date)
14:25	38.25	75.58	5.81	.084	999+	9.19	23.02	Brown	Depth 81', Purge Rate .2gpm
14:40	41.25	76.31	6.06	.106	999+	9.61	23.13	Brown	Depth 81', PR .1 gpm
14:55	42.75	77.03	5.80	.079	999+	9.10	23.56	Brown	Depth 81', PR .1gpm
15:00	— Lightening in Area - Burney C. - H+S said to stand down For 30 min.								
7-3-02 09:25	42.75	60.52	6.84	0.155	999+	9.50	19.86	Brown	7-3-02 Depth 81', PR 0.3gpm
09:40	47.25	69.51	6.91	0.081	~~619~~ 719	8.55	21.85	Brown	Depth 81', PR 0.25 gpm
09:55	51.0	75.58	6.14	0.053	635	7.72	24.32	Brown	Depth 81', PR 0.25gpm
10:00	- Pump malfunction, switching to different grundfos pump								
10:15	51.0	79.10	6.07	0.058	999+	6.84	23.45	Brown	Depth 81', PR 0.2 gpm
~~10:25~~ ~~10:30~~	~~53.0~~ ~~54.0~~ @	Well ran dry, will wait 20 minutes for 80% recovery							TD 81.14' − 60.52 = 20.62 × .80 = 16.5' = 81.14' TD − 16.5' = 64.64' water Level
10:45	- Well did not recharge 80% (DTW=76.34) 80							Recovery = 64.64' water level	
— : —	Recharge Rate = 81.14' TD − 76.34' DTW = 4.8'/20 min = .24 ft/min.								
10:30	39.30								
:									

Parcel No.: HR89QMW05
Well ID: MW05
Date: 7-8-02

7-8-02 PID 0.0, DTW 39.30, Lee FLIPPEN

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date)
7-8-02 10:30	53.0	39.30	7.55	.145	999+	10.47	21.16	Brown	7-8-02 Depth 50', PurgeRate 10 gpm
10:45	54.5	45.25	6.44	.094	999+	10.05	20.97	Brown	Depth 50', PR .10gpm
11:00	56.0	48.43	6.33	.092	999+	9.41	22.63	Brown	Depth 52', 54' PR .10gpm
11:15	57.5	49.41	6.37	.098	999+	9.67	22.02	Brown	Depth 56', 58' PR .10gpm
11:30	59.0	51.29	6.46	.101	999+	9.07	23.52	Brown	Depth 60, 62' PR .10 gpm
11:45	60.5	58.91	9.72	.203	999+	8.04	28.87	Brown	Depth 64, 66, PR .10gpm
12:00	62.0	60.11	9.94	.224	999+	11.18	20.73	Brown	Depth 68, 70, PR .10gpm
12:15	63.5	61.19	9.90	.210	999+	10.95	20.66	Brown	Depth 72, 74, PR .10gpm
5hrs 12:30	65.0	63.13	9.76	.196	999+	9.20	20.52	Brown	Depth 76, 78' PR .10gpm
12:45	66.5	63.23	9.65	.180	999+	8.29	20.42	Brown	Depth 80', PR .10gpm
13:00	67.0	64.28	8.46	.122	999+	8.19	26.58	Brown	Depth 80', PR .10gpm
13:15	68.5	65.13	7.92	.112	999+	8.90	24.65	Brown	Depth 80', PR .10gpm
13:30	70.0	67.72	6.72	.073	999+	9.59	23.97	Brown	Depth 80', PR .10 gpm
13:45	71.5	69.42	6.40	.069	999+	9.15	24.95	Brown	Depth 80', PR .05 gpm

Parcel No.: HR89Q
Well ID: MW05
Date: 7-8-02

Lee FLIPPEN

Time 24hr	Purge Volume (gal)	Water Level (ft) (TOC)	pH (std units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved oxygen (mg/L)	Temperature (°C)	Clarity (color)	Comments (Date if different from start date)
14:00	72.25	68.98	6.22	.075	999+	10.02	24.26	Brown	Depth 80', PurgeRate .05gpm
14:15	73.0	70.02	6.20	.074	999+	9.93	24.05	Brown	Depth 80', PR .05gpm
7hrs 14:30	73.75	72.52	6.33	.071	999+	9.96	24.19	Brown	Depth 80', PR .05gpm
14:45	74.5	72.91	6.23	.068	999+	10.09	23.29	Brown	Depth 80', PR .05gpm
15:00	75.25	73.23	6.12	.063	999+	9.97	23.41	Brown	Depth 80', PR .05gpm
15:15	76.0	73.88	5.97	.060	999+	10.16	22.92	Brown	Depth 80', PR .05gpm
8hrs 15:30	76.75	75.04	5.93	.060	999+	10.24	22.56	Brown	-8hours Dev. Time -Collected 1L H2O Photo Sample -Ran well Dry
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APPENDIX D

SURVEY DATA

Appendix D

Survey Data
Range 31: Weapons Demonstration Range, Parcel 89Q-X, and Former Defendum Field Firing Range No. 2, Parcel 215Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Northing	Easting	Ground Elevation (ft amsl)	Top of Casing Elevation (ft amsl)
HR-89Q-MW01	1177349.21	674124.59	851.09	853.09
HR-89Q-MW02	1177418.13	674970.17	846.91	848.96
HR-89Q-MW03	1177285.49	675452.58	853.32	855.41
HR-89Q-MW04	1176896.96	675631.10	858.70	861.04
HR-89Q-MW05	1177092.97	676168.55	874.98	877.14
HR-89Q-GP01	1177207.29	673364.07	941.56	NA
HR-89Q-GP02	1176878.83	673719.41	912.98	NA
HR-89Q-GP03	1177375.88	673909.57	871.57	NA
HR-89Q-GP04	1177380.62	674108.28	866.40	NA
HR-89Q-GP05	1177566.93	674524.56	869.74	NA
HR-89Q-GP06	1177700.49	675173.57	877.71	NA
HR-89Q-GP07	1176721.36	675008.03	855.64	NA
HR-89Q-GP08	1176627.06	676066.29	894.39	NA
HR-89Q-GP09	1176898.07	676193.11	896.88	NA
HR-89Q-GP10	1177160.79	676173.04	869.68	NA
HR-89Q-GP11	1177723.83	676153.37	878.95	NA
HR-89Q-GP12	1177132.20	676203.72	875.06	NA
HR-89Q-GP13	1176992.37	676265.89	898.28	NA
HR-89Q-GP14	1177782.20	676967.87	897.66	NA
HR-89Q-GP15	1177822.99	677821.83	914.22	NA
HR-89Q-GP16	1177763.30	678410.27	936.80	NA
HR-89Q-GP17	1177899.17	677968.67	936.68	NA
HR-89Q-GP18	1176408.52	677306.81	943.53	NA
HR-89Q-GP19	1176772.65	678049.40	969.82	NA
HR-89Q-GP20	1177122.49	678847.07	979.69	NA
HR-89Q-GP21	1176741.47	679667.37	1053.04	NA
HR-89Q-GP22	1177829.23	679570.51	988.57	NA
HR-89Q-GP23	1178260.99	678143.66	910.87	NA
HR-89Q-GP24	1176235.92	676641.03	898.72	NA
HR-89Q-GP25	1177981.89	677581.82	917.58	NA
HR-89Q-GP26	1178395.47	678573.72	970.87	NA
HR-89Q-GP27	1177020.85	677345.67	924.79	NA
HR-89Q-GP28	1176329.46	678084.48	971.46	NA
HR-89Q-GP29	1176380.79	679206.24	1126.34	NA
HR-89Q-GP30	1177002.88	680374.10	1037.60	NA
HR-89Q-GP31	1177730.21	680258.68	1063.84	NA
HR-89Q-GP32	1177479.90	673578.21	907.83	NA
HR-89Q-GP33	1177007.09	673803.86	886.83	NA
HR-89Q-GP34	1177283.04	674386.13	840.57	NA
HR-89Q-GP35	1177570.71	674689.28	850.59	NA

Appendix D

Survey Data
Range 31: Weapons Demonstration Range, Parcel 89Q-X, and Former Defendum Field Firing Range No. 2, Parcel 215Q
Fort McClellan, Calhoun County, Alabama

Sample Location	Northing	Easting	Ground Elevation (ft amsl)	Top of Casing Elevation (ft amsl)
HR-89Q-GP36	1177063.53	675135.58	857.25	NA
HR-89Q-GP37	1177703.30	675719.22	872.82	NA
HR-89Q-DEP01	1177335.20	674895.20	844.72	NA
HR-89Q-DEP02	1176942.06	674265.76	834.66	NA
HR-89Q-DEP03	1177379.37	675938.19	868.69	NA
HR-89Q-DEP04	1177623.34	676132.08	877.65	NA
HR-89Q-DEP05	1177603.73	677904.50	921.75	NA

Horizontal coordinates referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983 (NAD83).

Elevations referenced to the North American Vertical Datum of 1988 (NAVD88).

ft amsl - Feet above mean sea level
NA - Not applicable.

APPENDIX E

VARIANCE REPORTS

INTERNATIONAL TECHNOLOGY CORPORATION

Variance No: PARCEL89Q-XJULY02.VR03
Linked w/NC No: X
Date of Issue: 7-16-02

Page _1 of 1__

Project Name: **Fort McClellan** – CK 10

Project Number: 796887.11020300

-Variance Report -

I.Description: (by the person identifying the change)

FINAL SITE-SPECIFIC FIELD SAMPLING PLAN, RANGE 31:WEAPONS DEMONSTRATION RANGE, PARCEL 89Q-X

The Final Site-Specific Field Sampling Plan proposed the collection of a groundwater sample from residuum monitoring wells HR-89Q-MW01, HR-89Q-MW02, HR-89Q-MW03, HR-89Q-MW04 and HR-89Q-MW05. However, a groundwater sample was not collected from residuum monitoring well HR-89Q-MW01.

Identified by: Jeffrey J. Tarr, PG – IT Site Manager

Date: 7-16-02

II. Justification for Variance:

During hollow-stem auger drilling and well installation activities competent bedrock was encountered at approximately 43 feet below ground surface prior to reaching groundwater at monitoring well location HR-89Q-MW01. Several attempts were made to drill deeper for groundwater, but competent bedrock was encountered. Because groundwater tends to migrate along the soil \ bedrock interface at Fort McClellan, a decision was made to install the well on top of competent bedrock with the intent of having groundwater enter the well screen during periods of heavy rainfall. During groundwater sampling activities, groundwater was not present. Several attempts were made to collect a sample, but all attempts were unsuccessful. Currently, this well is being monitored for the presence of groundwater. Should the well contain enough groundwater, a sample will be collected for chemical analysis.

III. Applicable Document/Work Plan: (by the person identifying the change)

Final Site-Specific Field Sampling Plan, Site-Specific Safety and Health Plan, and Site-Specific Unexploded Ordnance Safety Plan Attachments; Range 31: Weapons Demonstration Range, Parcel 89Q-X and Former Defendum Field Firing Range No. 2, Parcel 215Q, Fort McClellan, Calhoun County, Alabama, April 2002.

Distribution List:
1. Jeanne Yacoub, IT Project Manager
2. Steve Moran, IT Technical Lead
3. Jeffrey Tarr, IT Site Manager
4. Randy McBride, IT QA Officer
5. Mr. Ellis Pope, US Army Corps of Engineers
6. Mr. Ross McCollum, US Army Corps of Engineers

- Signatures -

Requested by: Jeffrey Tarr, PG - IT Site Manager Jeffrey J Tarr 7-16-2002 Date

Approved by: COE Doug Sutton 7/17/02 Date

Project Manager Approval: Jeanne Yacoub 8/12/02 Date

QA Approval: Randall McBride 08-05-02 Date

INTERNATIONAL TECHNOLOGY CORPORATION

Variance No: PARCEL89Q-XJULY02.VR04

Linked w/NC No: x

Date of Issue: 7-17-02

Page _1 of 1__

Project Name: **Fort McClellan** – CK 10

Project Number: 796887.11020300

-Variance Report -

I.Description: (by the person identifying the change)

FINAL SITE-SPECIFIC FIELD SAMPLING PLAN, RANGE 31:WEAPONS DEMONSTRATION RANGE, PARCEL 89Q-X

The Final Site-Specific Field Sampling Plan (FSSFSP) proposed the collection of surface water samples and sediment samples at sample locations HR-89Q-SW\SD01, HR-89Q-SW\SD02, HR-89Q-SW\SD03 and HR-89Q-SW\SD04. These four surface water samples and sediment samples were not collected. Therefore, depositional soil samples were collected at these locations.

Identified by: Greg Sylwester, Risk Assessment Specialist

Date: 7-17-02

II. Justification for Variance:

The FSSFSP proposed a surface water sample and sediment sample at sample locations HR-89Q-SW\SD01, HR-89Q-SW\SD02, HR-89Q-SW\SD03 and HR-89Q-SW\SD04. Surface water was not present in Cave Creek or the tributary of Cave Creek during sample collection. Several attempts were made to collect samples, but all attempts were unsuccessful. Therefore, depositional soil samples HR-89Q-DEP02, HR-89Q-DEP03, HR-89Q-DEP04 and HR-89Q-DEP05 were collected at those locations to determine the presence or absence of contamination.

III. Applicable Document/Work Plan: (by the person identifying the change)

Final Site-Specific Field Sampling Plan, Site-Specific Safety and Health Plan, and Site-Specific Unexploded Ordnance Safety Plan Attachments; Range 31: Weapons Demonstration Range, Parcel 89Q-X and Former Defendum Field Firing Range No. 2, Parcel 215Q, Fort McClellan, Calhoun County, Alabama, April 2002.

Distribution List:
1. Jeanne Yacoub, IT Project Manager
2. Steve Moran, IT Technical Lead
3. Jeffrey Tarr, IT Site Manager
4. Randy McBride, IT QA Officer
5. Mr. Ellis Pope, US Army Corps of Engineers
6. Mr. Ross McCollum, US Army Corps of Engineers

- Signatures -

Requested by: Jeffrey Tarr, PG - IT Site Manager 7-17-2002 Date

Approved by: COE 07/18/02 Date

Project Manager Approval: Jeanne Yacoub 8/12/02 Date

QA Approval: Randall L. McBride 08-05-02 Date

INTERNATIONAL TECHNOLOGY CORPORATION

Variance No: PARCEL89Q-XJULY02.VR02

Linked w/NC No: X

Date of Issue: 7-15-02

Page _1 of 1__

Project Name: **Fort McClellan** – CK 10

Project Number: 796887.11020300

-Variance Report -

I.Description: (by the person identifying the change)

FINAL SITE-SPECIFIC FIELD SAMPLING PLAN, RANGE 31:WEAPONS DEMONSTRATION RANGE, PARCEL 89Q-X

The Final Site-Specific Field Sampling Plan (FSSFSP) proposed a surface soil sample and subsurface soil sample at sample location HR-89Q-GP15. Sample location HR-89Q-GP15 was relocated approximately 200 feet east of the proposed location.

Identified by: Jeffrey J. Tarr, PG – IT Site Manager

Date: 7-15-02

II. Justification for Variance:

The FSSFSP proposed one surface soil sample and one subsurface soil sample at sample location HR-89Q-GP15. The samples were to be collected adjacent and downslope of an empty 55-gallon drum located within the central portion of Range 31. However, the 55-gallon drum is actually located approximately 200 feet further east of where its shown on Figures 1-2 and 4-1 of the FSSFSP (physical feature number 7 on sample location map). Therefore, sample location HR-89Q-GP15 was relocated to that area and the soil samples were successfully collected. Relocating sample location HR-89Q-GP15 will more accurately determine the presence or absence of soil contamination at Range 31. This variance will not alter the scope or intent of the Site Investigation at Range 31.

III. Applicable Document/Work Plan: (by the person identifying the change)

Final Site-Specific Field Sampling Plan, Site-Specific Safety and Health Plan, and Site-Specific Unexploded Ordnance Safety Plan Attachments; Range 31: Weapons Demonstration Range, Parcel 89Q-X and Former Defendum Field Firing Range No. 2, Parcel 215Q, Fort McClellan, Calhoun County, Alabama, April 2002.

Distribution List:
1. Jeanne Yacoub, IT Project Manager
2. Steve Moran, IT Technical Lead
3. Jeffrey Tarr, IT Site Manager
4. Randy McBride, IT QA Officer
5. Mr. Ellis Pope, US Army Corps of Engineers
6. Mr. Ross McCollum, US Army Corps of Engineers

- Signatures -

Requested by: Jeffrey Tarr, PG - IT Site Manager Jeffrey J. Tarr 7-15-2002 Date

Approved by: [signature] 7/16/02 Date

Project Manager Approval: Jeanne Yacoub 8/12/02 Date

QA Approval: Randall L. McBride 08-05-02 Date

INTERNATIONAL TECHNOLOGY CORPORATION

Variance No: PARCEL89Q-XJULY02.VR01

Linked w/NC No: X

Date of Issue: 7-8-02

Page _1 of 1__

Project Name: **Fort McClellan** – CK 10

Project Number: 796887.11020300

-Variance Report -

I.Description: (by the person identifying the change)

FINAL SITE-SPECIFIC FIELD SAMPLING PLAN, RANGE 31:WEAPONS DEMONSTRATION RANGE, PARCEL 89Q-X

The Final Site-Specific Field Sampling Plan (FSSFSP) proposed a surface soil sample and subsurface soil sample at sample location HR-89Q-GP12. Sample location HR-89Q-GP12 was relocated approximately 300 feet southwest of the proposed location.

Identified by: Jeffrey J. Tarr, PG – IT Site Manager

Date: 7-8-02

II. Justification for Variance:

The FSSFSP proposed one surface soil sample and one subsurface soil sample at sample location HR-89Q-GP12. The samples were to be collected within a trench located adjacent to an intermittent stream. However, the trench shown on Figure 4-1 of the FSSFSP is not located adjacent to the stream. The trench is actually located approximately 300 feet further southwest of where it's shown on Figure 4-1, between an area of heavy lead concentration and popup target with fuel tank. Therefore, sample location HR-89Q-GP12 was relocated to that area and the soil samples were successfully collected. Relocating sample location HR-89Q-GP12 will more accurately determine the presence or absence of soil contamination at Range 31.

III. Applicable Document/Work Plan: (by the person identifying the change)

Final Site-Specific Field Sampling Plan, Site-Specific Safety and Health Plan, and Site-Specific Unexploded Ordnance Safety Plan Attachments; Range 31: Weapons Demonstration Range, Parcel 89Q-X and Former Defendum Field Firing Range No. 2, Parcel 215Q, Fort McClellan, Calhoun County, Alabama, April 2002.

Distribution List:
1. Jeanne Yacoub, IT Project Manager
2. Steve Moran, IT Technical Lead
3. Jeffrey Tarr, IT Site Manager
4. Randy McBride, IT QA Officer
5. Mr. Ellis Pope, US Army Corps of Engineers
6. Mr. Ross McCollum, US Army Corps of Engineers

- Signatures -

Requested by: Jeffrey Tarr, PG - IT Site Manager Jeffrey J. Tarr 7-8-2002 Date

Approved by: COL Dwight A. Shelton 7/19/02 Date

Project Manager Approval: Jeanne Yacoub 8/12/02 Date

QA Approval: Randall L. McBride 08-05-02 Date

Response to ADEM and EPA Comments on the Final Work Plan
Parcels 89Q-X and 215Q
Fort McClellan, Calhoun County, Alabama

Alabama Department of Environmental Management (ADEM) Comments	
Comment	**Response**
On May 1, 2003, the Alabama Department of Environmental Management (ADEM or the Department) issued a letter to Fort McClellan presenting ADEM's review comments on the *Draft SI Report for Range 31: Weapons Demonstrations Range, Parcel 89Q-X, and Former Defendum Firing Range No. 2, Parcel 215Q.* The Draft SI Report was dated February 2003.	Comments noted. Responses to ADEM comments on the Draft SI report are provided in the draft-final version of the document.
Fort McClellan has recently inquired about the status of the Department's review of the April 2002 work plan. This letter serves to notify Fort McClellan that the Department's review comments on the subject Draft SI Report were intended to also apply to the outstanding April 2002 work plan for parcels 89Q-X and 215Q.	The report was revised to include separate recommendations based on the future property owners (i.e., Joint Powers Authority [JPA] or U.S. Fish & Wildlife Service [USFWS]). The JPA portion of the property, which contains the visible bullet fragments, was recommended for disposition according the agreed upon requirements in the Environmental Services Cooperative Agreement (ESCA)/Technical Specifications and Requirement Statement (TSRS) and the Cleanup Agreement between the Alabama Department of Environmental Management (ADEM) and JPA. The USFWS portion of the property was recommended for "No Further Action" based on the analytical data and the absence of bullets within that portion of the site. In addition, the Anniston Water Works and Sewer Board water tank site was also recommended for "No Further Action."
To reiterate the Department's review comments presented in the May 1 letter, based on ADEM's review of Fort McClellan's Work Plan and the findings and analytical data presented in the Draft SI Report, further investigation appears warranted. Due to the limited number of samples collected, the spatial distribution of sampling locations and the methodology used to select the sampling locations, it appears that the nature and extent of contamination at Parcel's 89Q-X and 215Q are not adequately characterized.	

U.S. Environmental Protection Agency (EPA) Region 4 Comments	
Comment	**Response**
This SSFP is well prepared and well written. It appears that the proposed sampling coverage will define whether or not any contamination is present. However, the following comment should be addressed before the document is finalized. The safety and health and unexploded ordnance portions of this document were not reviewed by EPA.	Comment noted. The locations for full-suite analysis were generally placed in the areas with the most observed site features (i.e., areas most likely to be contaminated). This information was added to the draft-final SI report.
At several places in the SSFP, it is stated that TCL organic analyses will be performed on samples collected from ten percent of the sampling locations during the site investigation. An explanation should be added to define how these sampling locations will be selected to assure adequate and representative coverage.	